

SEQUENCE LISTING

<110> University of North Carolina-Chapel Hill
Stafford, Darrel
Li, Tao

<120> IDENTIFICATION OF THE GENE FOR VITAMIN K EPOXIDE REDUCTASE

<130> 5470.401WO

<150> US 60/505,527

<151> 2003-09-23

<160> 34

<170> PatentIn version 3.2

<210> 1

<211> 21

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide primer

<400> 1

tccaacagca tattcgggtg c

21

<210> 2

<211> 21

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide primer

<400> 2

ttcttggacc ttccggaaac t

21

<210> 3

<211> 19

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide primer

<400> 3

gaaggtgaag gtcggagtc

19

<210> 4

<211> 20

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide primer

<400> 4
gaagatggtg atgggatttc 20

<210> 5
<211> 21
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic oligonucleotide primer

<400> 5
ctaggtgagg ccaagaagca a 21

<210> 6
<211> 21
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic oligonucleotide primer

<400> 6
ctgttcctct cagcagactg c 21

<210> 7
<211> 12
<212> PRT
<213> Artificial sequence

<220>
<223> HPC4 tag sequence

<400> 7

Glu Asp Gln Val Asp Pro Arg Leu Ile Asp Gly Lys
1 5 10

<210> 8
<211> 3915
<212> DNA
<213> Homo sapiens

<400> 8
ggttttctcc gcgggcgcct cgggcggaac ctggagataa tgggcagcac ctgggggagc 60
cctggctggg tgccgctcgc tctttgcttg acgggcttag tgctctcgct ctacgcgctg 120
cacgtgaagg cggcgcgcgc cggggaccgg gattaccgcg cgctctgcga cgtgggcacc 180
gccatcagct gttcgcgcgt cttctcctcc aggtgtgcac gggagtggga ggcgtggggc 240
ctcggagcag ggccggccagg atgccagatg attattctgg agtctgggat cgggtgtgcc 300
ggggaacgga cacggggctg gactgctcgc ggggtcgttg cacaggggct gagctaccca 360
gcgatactgg tgttcgaaat aagagtgcga ggcaaggac cagacagtgc tggggactgg 420

gattattccg gggactcgca cgtgaattgg atgccaagga ataacggtga ccaggaaagg 480
 cggggaggca ggatggcggg agagattgac gatgggtctca aggacggcgc gcagggtgaag 540
 ggggggtgttg gcgatggctg cgcccaggaa caaggtggcc cggctctggct gtgcgtgatg 600
 gccaggcggtt agcataatga cggaatacag aggaggcgag tgagtggcca gggagctgga 660
 gattctgggg tccaggggcaa agataatctg cccccgactc ccagtctctg atgcaaaacc 720
 gagtgaaccg ttataaccagc cttgccattt taagaattac ttaagggccg ggcgcgggtg 780
 cccactcctg taatcccagc actttgggag gccgaggcgg atggatcact tgaagtcagg 840
 agttgaccag cctggccaac atggtgaaag cctgtctcta caaaaaatag aaaaattaat 900
 cgggcgctat ggcgggtgcc ttaatcccag ctactcgggg gggctaaggc aggagaatcg 960
 cttgaaccgg ggaggcggag gtttcagtga gccgagatcg cgccactgca ctccagcctg 1020
 ggccagagtg agactccgtc tcaaaaaaaaa aaaaaaaaaa aaaaaaaaaag agacttactt 1080
 aaggtctaag atgaaaagca gggcctacgg agtagccacg tccgggcctg gtctggggag 1140
 aggggaggat agggtcagtg acatggaatc ctgacgtggc caaagggtgcc cggtgccagg 1200
 agatcatcga cccttggaact aggatgggag gtcggggaac agaggatagc ccagggtggct 1260
 tcttggaat cacctttctc gggcagggtc caaggcactg gggtgacagt cctaacctgg 1320
 ttccaccca cccacccct ctgccagggt gggcaggggt ttcgggctgg tggagcatgt 1380
 gctgggacag gacagcatcc tcaatcaatc caacagcata ttcggttgca tcttctacac 1440
 actacagcta ttgttaggtg agtggctccg cccctccct gcccgccccg ccccgccct 1500
 catccccctt ggtcagctca gcccactcc atgcaatctt ggtgatccac acagctgaca 1560
 gccagctagc tgctcatcac ggagcgtcct gcgggtgggg atgtggggag gtaactaaca 1620
 ggagtctttt aattggttta agtactgtta gaggtgaag ggcccttaa gacatcctag 1680
 gtccccagggt tttttgtttg ttgttgttt gagacagggt ctggctctgt tgcccaaagt 1740
 gaggtctagg atgcccttag tgtgcaactg cgtgatctca gttcatggca acctctgcct 1800
 ccctgcccaa gggatccctc caccttagcc tccaagcag ctggaatcac aggcgtgcac 1860
 cactatgcc agctaatttt tgtttttgtt ttttttggg agagatgggt tctcgccatg 1920
 ttgccaggc tgggtctcaag caatctgtct gctcagcct cccaaagtgc tggggggatt 1980
 acaggcgtga gctaccatgc cccaccaaca cccagtttt gtggaaaaga tgccgaaatt 2040
 cctttttaag gagaagctga gcatgagcta tcttttgtct catttagtgc tcagcaggaa 2100
 aatttgtatc tagtcccata agaacagaga gaggaaccaa gggagtggaa gacgatggcg 2160
 ccccaggcct tgctgatgcc atatgccgga gatgagacta tccattacca cccttcccag 2220

caggctccca cgctcccttt gagtcaccct tcccagctcc agagaaggca tcaactgaggg 2280
 aggcccagca ccatgggtcct gggtgacaca tgggttcagac ttggccgatt tattttaagaa 2340
 atttttattgc tcagaacttt ccctccctgg gcaatggcaa gagcttcaga gaccagtccc 2400
 ttggagggga cctggtgaag ccttcttttt tttttttttt aagaaataat cttgctctgt 2460
 tgcccaggct ggagtgcagt ggcacaatca tagctcactg taacctggct caagcgatcc 2520
 tcctgagtag ctaggactat aggcatgtca ctgcaccag ctaatttttt tttttttttt 2580
 tttttttttt ttgcgacata gtctcgctct gtcaccaggc tggagtgcag tggcacgac 2640
 ttggctcact gcaacctctg cctcccggt tcaagcaatt ttctgcctc agcctcctga 2700
 gtagctggga ctacaggcgc gtgtcaccac gccagctaa tttttgtatt tttagtggag 2760
 acagggtttc accatgttgg ctaggatggt ctcaatctct tgacctggtg atccatccgc 2820
 cttggcctcc caaagtgcta ggattacagg cgtgagtcaa cctcaccggg catttttttt 2880
 ttgagacgaa gtcttgctct tgctgcccaa gctggaatgt ggtggcatga tctcggtca 2940
 ctgcaacctc cacctcctag gttcaagcga ttctccacct tagcctcccc agcagctggg 3000
 attacaggtg cccatcaaca caccggcta atttttgtat ttttattaga gatggggttt 3060
 tgccatgttg gccaggctgc tctcgaactc ctaacctcag gtgatccacc cccattggcc 3120
 tccaaaata ctgggattac aggcatgagc caccgtgccc agctgaattt ctaaattttt 3180
 gatagagatc gggctcttct atgttgccca agctggtctt gaactcctag cctaaagcag 3240
 tcttcccacc tcggcctccc agagtgtttg gaatacgtgc gtaagccacc acatctgccc 3300
 tggagcctct tgtttttagag acccttccca gcagctcctg gcactctaggt agtgcagtga 3360
 catcatggag tgttcgggag gtggccagtg cctgaagccc acaccggacc ctcttctgcc 3420
 ttgcaggttg cctgcggaca cgctgggcct ctgtcctgat gctgctgagc tccctggtgt 3480
 ctctcgctgg ttctgtctac ctggcctgga tctgttctt cgtgctctat gatttctgca 3540
 ttgtttgtat caccacctat gctatcaacg tgagcctgat gtggctcagt ttccggaagg 3600
 tccaagaacc ccagggaag gctaagaggc actgagccct caacccaagc caggctgacc 3660
 tcactgctt tgctttggca tgtgagcctt gcctaagggg gcatactctg gtccctagaa 3720
 ggccctagat gtggggcttc tagattacc cctcctcctg ccataccgc acatgacaat 3780
 ggaccaaagtg tgccacacgc tcgctctttt ttacaccag tgccctctgac tctgtcccca 3840
 tgggctggtc tccaaagctc tttccattgc ccaggagggg aaggttctga gcaataaagt 3900
 ttcttagatc aatca 3915

<210> 9
 <211> 806

agggaggaggaa ggttctgagc aataaagttt

806

<210> 10
 <211> 163
 <212> PRT
 <213> Homo sapiens

<400> 10

Met Gly Ser Thr Trp Gly Ser Pro Gly Trp Val Arg Leu Ala Leu Cys
 1 5 10 15

Leu Thr Gly Leu Val Leu Ser Leu Tyr Ala Leu His Val Lys Ala Ala
 20 25 30

Arg Ala Arg Asp Arg Asp Tyr Arg Ala Leu Cys Asp Val Gly Thr Ala
 35 40 45

Ile Ser Cys Ser Arg Val Phe Ser Ser Arg Trp Gly Arg Gly Phe Gly
 50 55 60

Leu Val Glu His Val Leu Gly Gln Asp Ser Ile Leu Asn Gln Ser Asn
 65 70 75 80

Ser Ile Phe Gly Cys Ile Phe Tyr Thr Leu Gln Leu Leu Leu Gly Cys
 85 90 95

Leu Arg Thr Arg Trp Ala Ser Val Leu Met Leu Leu Ser Ser Leu Val
 100 105 110

Ser Leu Ala Gly Ser Val Tyr Leu Ala Trp Ile Leu Phe Phe Val Leu
 115 120 125

Tyr Asp Phe Cys Ile Val Cys Ile Thr Thr Tyr Ala Ile Asn Val Ser
 130 135 140

Leu Met Trp Leu Ser Phe Arg Lys Val Gln Glu Pro Gln Gly Lys Ala
 145 150 155 160

Lys Arg His

<210> 11
 <211> 5915
 <212> DNA
 <213> Homo sapiens

<400> 11

caccatcaga tgggacgtct gtgaaggaga gacctcatct ggccacagc ttggaaagga

60

gagactgact gttgagttga tgcaagctca ggtggtgcc a ggcgggcgcc atgatagtag 120
 agaggtagg atactgtcaa ggggtgtgtg ggccaaagga gtggttctgt gaatgtatgg 180
 gagaaagga gaccgaccac caggaagcac tggtagaggca ggacccggga ggatgggagg 240
 ctgcagcccc aatgggtgcct gaaatagttt caggggaaat gcttggttcc cgaatcggat 300
 cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt 360
 acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt 420
 ttttcttttt tttttttgag acagagtctc actctgtcgg cctggctgga gtgcagtggc 480
 acgatctcgg ctcaactgcaa cctccggctc cccggctcaa gcaattctcc tgcctcagcc 540
 tcccagtag ctgggattac aggcattgtc caccacgcc ggctaatttt tgtattttta 600
 gttgagatgg ggtttcacca tgttggcgag gctggtcttg aactcctgac ctgaggaat 660
 ccgccagcct cggcctccca aagtgtcggg attacaaagc tgagccaccg tgcccgccca 720
 acagttttta aatctgtgga gacttcattt cccttgatgc cttgcagccg cgccgactac 780
 aactcccatc atgcctggca gccgtgggg ccgcgattcc gcacgtccct taccgcttc 840
 actagtcccg gcattcttcg ctgttttcct aactcgcccg cttgactagc gccctggaac 900
 agccatttgg gtcgtggagt gcgagcacgg ccggccaatc gccgagtcag agggccagga 960
 ggggcgcggc cattcgccgc ccggcccctg ctccgtggct ggttttctcc gcgggcgcct 1020
 cgggcggaac ctggagataa tgggcagcac ctgggggagc cctggctggg tgcggctcgc 1080
 tctttgcctg acgggcttag tgctctcgct ctacgcgctg cacgtgaagg cggcgcgcgc 1140
 ccgggaccgg gattaccgcg cgctctgca cgtgggcacc gccatcagct gttcgcgcgt 1200
 cttctcctcc aggtgtgcac gggagtggga ggcgtggggc ctccggagcag ggcggccagg 1260
 atgccagatg attattctgg agtctgggat cgggtgtgcc ggggaacgga cacggggctg 1320
 gactgctcgc ggggtcgttg cacaggggct gagctacca gcgatactgg tgttcgaaat 1380
 aagagtgcga ggcaaggac cagacagtgc tggggactgg gattattccg gggactcgca 1440
 cgtgaattgg atgccaagga ataacggtga ccaggaaagg cggggaggca ggatggcggt 1500
 agagattgac gatggtctca aggacggcgc gcaggtgaag gggggtgttg gcgatggctg 1560
 cgcccaggaa caaggtggcc cggctctggct gtgcgtgatg gccaggcgtt agcataatga 1620
 cggaatacag aggaggcgag tgagtggcca gggagctgga gattctgggg tccagggcaa 1680
 agataatctg cccccgactc ccagtctctg atgcaaaacc gagtgaaccg ttataaccagc 1740
 cttgccattt taagaattac ttaagggccg ggcgcggtgg cccactcctg taatcccagc 1800
 actttgggag gccgaggcgg atggatcact tgaagtcagg agttgaccag cctggccaac 1860

atggtgaaag	cctgtctcta	ccaaaaatag	aaaaattaat	cgggcgctat	ggcgggtgcc	1920
ttaatcccag	ctactcgggg	gggctaaggc	aggagaatcg	cttgaacccg	ggaggcggag	1980
gtttcagtga	gccgagatcg	cgccactgca	ctccagcctg	ggccagagtg	agactccgtc	2040
tcaaaaaaaaa	aaaaaaaaaaa	aaaaaaaaaag	agacttactt	aagggtctaag	atgaaaagca	2100
gggcctacgg	agtagccacg	tccgggcctg	gtctggggag	aggggaggat	agggtcagtg	2160
acatggaatc	ctgacgtggc	caaagggtgcc	cggtgccagg	agatcatcga	cccttggtact	2220
aggatgggag	gtcgggggaac	agaggatagc	ccagggtggct	tcttggaat	cacctttctc	2280
gggcagggtc	caaggcactg	ggttgacagt	cctaacctgg	ttccacccca	ccccacccct	2340
ctgccagggtg	gggcaggggt	ttcgggctgg	tggagcatgt	gctgggacag	gacagcatcc	2400
tcaatcaatc	caacagcata	ttcggttgca	tcttctacac	actacagcta	ttgttaggtg	2460
agtggctccg	ccccctccct	gcccgcctcg	ccccgcctct	catccccctt	ggtcagctca	2520
gccccactcc	atgcaatctt	ggtgatccac	acagctgaca	gccagctagc	tgctcatcac	2580
ggagcgtcct	gcgggtgggg	atgtggggag	gtaactaaca	ggagtctttt	aattggttta	2640
agtactgtta	gaggctgaag	ggcccttaaa	gacatcctag	gtccccagggt	tttttgtttg	2700
ttgttgtttt	gagacaggggt	ctggctctgt	tgcccaaagt	gaggtctagg	atgcccttag	2760
tgtgcactgg	cgtgatctca	gttcatggca	acctctgcct	ccctgcccga	gggatccctcc	2820
caccttagcc	tcccaagcag	ctggaatcac	aggcgtgcac	cactatgccc	agctaatttt	2880
tgtttttgtt	tttttttgggt	agagatgggtg	tctcgccatg	ttgccaggc	tggtctcaag	2940
caatctgtct	gcctcagcct	cccaaagtgc	tggggggatt	acaggcgtga	gctaccatgc	3000
cccaccaaca	ccccagtttt	gtggaaaaga	tgccgaaatt	cctttttaag	gagaagctga	3060
gcatgagcta	tcttttgtct	catttagtgc	tcagcaggaa	aatttgtatc	tagtcccata	3120
agaacagaga	gaggaaccaa	gggagtggaa	gacgatggcg	ccccaggcct	tgctgatgcc	3180
atatgccgga	gatgagacta	tccattacca	cccttcccag	caggtcccca	cgctcccttt	3240
gagtcaccct	tcccagctcc	agagaaggca	tactgagggt	aggcccagca	ccatggctct	3300
ggctgacaca	tggttcagac	ttggccgatt	tatttaagaa	attttattgc	tcagaacttt	3360
ccctccctgg	gcaatggcaa	gagcttcaga	gaccagtccc	ttggagggga	cctgttgaag	3420
ccttcttttt	tttttttttt	aagaaataat	cttgctctgt	tgcccaggct	ggagtgcagt	3480
ggcacaaatca	tagctcactg	taacctggct	caagcgatcc	tcctgagtag	ctaggactat	3540
aggcatgtca	ctgcacccag	ctaatttttt	tttttttttt	tttttttttt	ttgcgacata	3600
gtctcgctct	gtcaccaggc	tggagtgcag	tggcacgata	ttggctcact	gcaacctctg	3660
cctcccggtg	tcaagcaatt	ttcctgcctc	agcctcctga	gtagctggga	ctacaggcgc	3720

gtgtcaccac gccagctaa tttttgtatt tttagtggag acagggtttc accatggttg 3780
 ctaggatggg ctcaatctct tgacctgggtg atccatccgc cttggcctcc caaagtgcta 3840
 ggattacagg cgtgagtcaa cctcaccggg catttttttt ttgagacgaa gtcttgctct 3900
 tgctgcccaa gctggaatgt ggtggcatga tctcggctca ctgcaacctc cacctcctag 3960
 gttcaagcga ttctccacct tagcctcccc agcagctggg attacaggtg cccatcaaca 4020
 caccgggcta atttttgtat ttttattaga gatgggggtt tgccatgttg gccaggtgc 4080
 tctcgaactc ctaacctcag gtgatccacc cccattggcc tcccaaaata ctgggattac 4140
 aggcatgagc caccgtgccc agctgaattt ctaaattttt gatagagatc gggctcttct 4200
 atgttgccca agctgggtctt gaactcctag cctaaagcag tcttcccacc tcggcctccc 4260
 agagtgtttg gaatacgtgc gtaagccacc acatctgccc tggagcctct tgttttagag 4320
 acccttccca gcagctcctg gcactctaggt agtgcagtga catcatggag tgttcgggag 4380
 gtggccagtg cctgaagccc acaccggacc ctcttctgcc ttgcaggttg cctgcggaca 4440
 cgctgggcct ctgtcctgat gctgctgagc tccctgggtg ctctcgctgg ttctgtctac 4500
 ctggcctgga tcctgttctt cgtgctctat gatttctgca ttgtttgtat caccacctat 4560
 gctatcaacg tgagcctgat gtggctcagt ttccggaagg tccaagaacc ccagggcaag 4620
 gctaagaggc actgagccct caaccgaagc caggctgacc tcatctgctt tgctttggca 4680
 tgtgagcctt gcctaagggg gcatactctg gtccctagaa ggccctagat gtggggcttc 4740
 tagattacc cctcctcctg ccataccgc acatgacaat ggaccaaagtg tgccacacgc 4800
 tcgctctttt ttacaccag tgccctctgac tctgtccca tgggctgggc tccaaagctc 4860
 tttccattgc ccaggaggagg aagggtctga gcaataaagt ttcttagatc aatcagccaa 4920
 gtctgaacca tgtgtctgcc atggactgtg gtgctgggccc tccctcggtg ttgccttctc 4980
 tggagctggg aagggtgagt cagagggaga gtggagggcc tgctgggaag ggtggttatg 5040
 ggtagtctca tctccagtgt gtggagtcat caaggcctgg ggcaccattg gccccaccc 5100
 ccaggaaaca ggctggcagc tcgctcctgc tgccacagg agccaggcct cctctcctgg 5160
 gaaggctgag cacacacctg gaagggcagg ctgcccttct gggtctgtaa atgcttgctg 5220
 ggaagttctt ccttgagttt aactttaacc cctccagttg ccttatcgac cattccaagc 5280
 cagtattggg agccttgag ggtcagggcc aggttggtgaa ggtttttgtt ttgcctatta 5340
 tgccctgacc acttacctac atgccaagca ctgtttaaga acttggtgtg gcagggtgca 5400
 gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc 5460
 caggagttcc agaccagcct gggcaaaata gtgagacccc tgtctctaca aaaaaaaaaa 5520

aaaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcgggaag 5580
 ctggcgggaa gactgcttga gcccagaagg ttgaggctgc agtgagccat gatcactgca 5640
 ctccagcctg agcaacagag caagaccgtc tccaaaaaaaa aacaaaaaac aaaaaaaaaac 5700
 ttgtgttaac gtgttaaact cgtttaatct ttacagtgat ttatgaggtg ggtactatta 5760
 ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc 5820
 tactgcagga ggctctcagg atttgaatcc acctgggtcca tctgggtcca gcatctatat 5880
 gctttttttt ttgttggttt gtttttgaga cggac 5915

<210> 12

<211> 5915

<212> DNA

<213> Homo sapiens

<400> 12

caccatcaga tgggacgtct gtgaaggaga gacctcatct ggcccacagc ttggaaagga 60
 gagactgact gttgagttga tgcaagctca ggtgttgcca ggcgggcgcc atgatagtag 120
 agaggttagg atactgtcaa ggggtgtgtgt ggccaaagga gtggttctgt gaatgtatgg 180
 gagaaagggg gaccgaccac caggaagcac tggtgaggca ggaccgggga ggatgggagg 240
 ctgcagcccc aatgggtgcct gaaatagttt caggggaaat gcttggttcc cgaatcggat 300
 cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt 360
 acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt 420
 ttttcttttt tttttttgag acagagtctc actctgtcgg cctggctgga gtgcagtggc 480
 acgatctcgg ctcaactgcaa cctccggctc cccggctcaa gcaattctcc tgccctcagcc 540
 tcccagtag ctgggattac aggcatgtgc caccacgccc ggctaatttt tgtattttta 600
 gttgagatgg ggtttcacca tgttggcgag gctggtcttg aactcctgac ctcaggtaat 660
 ccgccagcct cggcctccca aagtgtctgg attacaagcg tgagccaccg tgcccggcca 720
 acagttttta aatctgtgga gacttcattt cccttgatgc cttgcagccg cgccgactac 780
 aactcccatc atgcctggca gccgctgggg ccgcgattcc gcacgtccct taccgcttc 840
 actagtcccc gcattcttcg ctgttttccct aactcgcccc cttgactagc gccctggaac 900
 agccatttgg gtcgtggagt gcgagcacgg ccggccaatc gccgagtcag agggccagga 960
 ggggcgcggc cattcgccgc ccggcccctg ctccgtggct ggttttctcc gcgggcgcct 1020
 cgggcggaac ctggagataa tgggcagcac ctgggggagc cctggctggg tgcggctcgc 1080
 tctttgcctg acgggcttag tgctctcgtc ctacgcgctg cacgtgaagg cggcgcgcgc 1140
 ccgggaccgg gattaccgcg cgctctgcga cgtgggcacc gccatcagct gttcgcgcgt 1200

cttctcctcc aggtgtgcac gggagtggga ggcgtggggc ctcggagcag ggcggccagg 1260
atgccagatg attattctgg agtctgggat cgggtgtgcc ggggaacgga cacggggctg 1320
gactgtctgc ggggtcgttg cacaggggct gagctacca gcgatactgg tgttcgaaat 1380
aagagtgcga ggcaagggac cagacagtgc tggggactgg gattattccg gggactcgca 1440
cgtgaattgg atgccaagga ataacggtga ccaggaaagg cggggaggca ggatggcggt 1500
agagattgac gatggtctca aggacggcgc gcaggatgaag gggggtgttg gcgatggctg 1560
cgcccaggaa caaggtggcc cggctctggct gtgcgtgatg gccaggcggt agcataatga 1620
cggaatacag aggaggcgag tgagtggcca gggagctgga gattctgggg tccagggcaa 1680
agataatctg cccccgactc ccagtctctg atgcaaaacc gagtgaaccg ttataccagc 1740
cttgccattt taagaattac ttaagggccg ggcgcgggtg cccactcctg taatcccagc 1800
actttgggag gccgaggcgg atggatcact tgaagtcagg agttgaccag cctggccaac 1860
atggtgaaag cctgtctcta caaaaatag aaaaattaat cgggcgctat ggcgggtgcc 1920
ttaatcccag ctactcgggg gggctaaggc aggagaatcg cttgaacccg ggaggcggag 1980
gtttcagtga gccgagatcg cgccactgca ctccagcctg ggccagagtg agactccgtc 2040
tcaaaaaaaaa aaaaaaaaaa aaaaaaaag agacttactt aaggtctaag atgaaaagca 2100
gggectacgg agtagccaag tccgggcctg gtctggggag aggggaggat agggtcagtg 2160
acatggaatc ctgacgtggc caaaggtgcc cggtgccagg agatcatcga cccttggaact 2220
aggatgggag gtcggggaac agaggatagc ccagggtggct tcttggaat cacctttctc 2280
gggcagggtc caaggcactg ggttgacagt cctaacctg ttcacccca cccacccct 2340
ctgccagggt gggcaggggt ttcgggctgg tggagcatgt gctgggacag gacagcatcc 2400
tcaatcaatc caacagcata ttcggttgca tcttctacac actacagcta ttgttaggtg 2460
agtggctccg cccctccct gcccgccccg ccccgccct catccccctt ggtcagctca 2520
gccccactcc atgcaatctt ggtgatccac acagctgaca gccagctagc tgctcatcac 2580
cgagcgtcct gcgggtgggg atgtggggag gtaactaaca ggagtctttt aattggttta 2640
agtactgtta gaggtgaag ggccctaaa gacatcctag gtccccagg tttttgtttg 2700
ttgttgtttt gagacaggg ctggctctgt tgcccaaagt gaggtctagg atgcccttag 2760
tgtgcaactg cgtgatctca gttcatggca acctctgcct ccctgcccga gggatccctc 2820
caccttagcc tccaagcag ctggaatcac aggcgtgcac cactatgccc agctaatttt 2880
tgtttttgtt tttttttggt agagatggtg tctcgccatg ttgcccaggc tgggtctcaag 2940
caatctgtct gcctcagcct cccaaagtgc tggggggatt acaggcgtga gctaccatgc 3000
cccaccaaca cccagtttt gtggaaaaga tgccgaaatt cctttttaag gagaagctga 3060

gcatgagcta tcttttgtct catttagtgc tcagcaggaa aatttgtatc tagtcccata 3120
 agaacagaga gaggaaccaa gggagtggaa gacgatggcg cccagggcct tgctgatgcc 3180
 atatgccgga gatgagacta tccattacca cccttcccag caggctccca cgctcccttt 3240
 gagtaccct tcccagctcc agagaaggca tcaactgaggg agggccagca ccatggctct 3300
 ggctgacaca tggttcagac ttggccgatt tatttaagaa attttattgc tcagaacttt 3360
 ccctccctgg gcaatggcaa gagcttcaga gaccagtccc ttggagggga cctgttgaag 3420
 ccttcttttt tttttttttt aagaaataat cttgctctgt tgcccaggct ggagtgcagt 3480
 ggcacaatca tagctcactg taacctggct caagcgatcc tcctgagtag ctaggactat 3540
 aggcattgtca ctgcaccag ctaatttttt tttttttttt tttttttttt ttgcgacata 3600
 gtctcgctct gtcaccaggc tggagtgcag tggcacgac ttggctcact gcaacctctg 3660
 cctcccggt tcaagcaatt ttctgcctc agcctcctga gtagctggga ctacaggcgc 3720
 gtgtcaccac gccagctaa ttttgtatt tttagtggag acagggtttc accatgttgg 3780
 ctaggatggt ctcaatctct tgacctggtg atccatccgc cttggcctcc caaagtgcta 3840
 ggattacagg cgtgagtcaa cctcaccggg catttttttt ttgagacgaa gtcttgctct 3900
 tgctgcccac gctggaatgt ggtggcatga tctcggtca ctgcaacctc cacctcctag 3960
 gttcaagcga ttctccacct tagcctccc agcagctggg attacagggtg cccatcaaca 4020
 caccoggcta atttttgtat ttttattaga gatgggggtt tgccatgttg gccaggctgc 4080
 tctcgaactc ctaacctcag gtgatccacc ccatttggcc tccaaaata ctgggattac 4140
 aggcatgagc caccgtgccc agctgaattt ctaaattttt gatagagatc gggctcttct 4200
 atgttgccca agctggtctt gaactcctag cctaaagcag tcttcccacc tcggcctccc 4260
 agagtgtttg gaatacgtgc gtaagccacc acatctgccc tggagcctct tgttttagag 4320
 acccttccca gcagctcctg gcatctaggt agtgcagtga catcatggag tgttcgggag 4380
 gtggccagtg cctgaagccc acaccggacc ctcttctgcc ttgcagggtg cctgaggaca 4440
 cgctgggcct ctgtcctgat gctgctgagc tccctgggtg ctctcgctgg ttctgtctac 4500
 ctggcctgga tcctgttctt cgtgctctat gatttctgca ttgtttgtat caccacctat 4560
 gctatcaacg tgagcctgat gtggtcagt ttccggaagg tccaagaacc ccagggcaag 4620
 gctaagaggc actgagccct caaccaagc caggctgacc tcactctgctt tgctttggca 4680
 tgtgagcctt gcctaagggg gcatatctgg gtccctagaa ggccctagat gtggggcttc 4740
 tagattacc cctcctcctg ccataccgc acatgacaat ggaccaaagtg tgccacacgc 4800
 tcgctctttt ttacaccag tgctctgac tctgtccca tgggctggtc tccaaagctc 4860

```

tttccattgc ccagggaggg aaggttctga gcaataaagt ttcttagatc aatcagccaa 4920
gtctgaacca tgtgtctgcc atggactgtg gtgctgggcc tccctcgggtg ttgccttctc 4980
tgtagctggg aaggggtgagt cagagggaga gtggagggcc tgctgggaag ggtgggttatg 5040
ggtagtctca tctccagtgt gtggagtcag caaggcctgg ggcaccattg gccccacccc 5100
ccaggaaaca ggctggcagc tcgtctctgc tgcccacagg agccaggcct cctctcctgg 5160
gaaggctgag cacacacctg gaagggcagg ctgcccttct ggttctgtaa atgcttgctg 5220
ggaagtctct ccttgagttt aactttaacc cctccagttg ccttatcgac cattccaagc 5280
cagtattggt agccttgagg ggtcagggcc aggttggtga ggtttttgtt ttgcctatta 5340
tgccctgacc acttacctac atgccaagca ctgtttaaga acttggtgtg gcaggggtgca 5400
gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc 5460
caggagttcc agaccagcct gggcaaaata gtgagacccc tgtctctaca aaaaaaaaaa 5520
aaaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcggaag 5580
ctggcgggaa gactgcttga gccagaagg ttgaggctgc agtgagccat gatcactgca 5640
ctccagcctg agcaacagag caagaccgtc tccaaaaaaaa aacaaaaaac aaaaaaaac 5700
ttgtgttaac gtgttaaact cgtttaatct ttacagtgat ttatgaggtg ggtactatta 5760
ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc 5820
tactgcagga ggctctcagg atttgaatcc acctgggtcca tctgggtcca gcatctatat 5880
gctttttttt ttgttggttt gtttttgaga cggac 5915

```

<210> 13

<211> 5915

<212> DNA

<213> Homo sapiens

<400> 13

```

caccatcaga tgggacgtct gtgaaggaga gacctcatct ggcccacagc ttggaaagga 60
gagactgact gttgagttga tgcaagctca ggtgttgcca ggcgggcgcc atgatagtag 120
agagggttagg atactgtcaa ggggtgtgtgt ggccaaagga gtggttctgt gaatgtatgg 180
gagaaagggg gaccgaccac caggaagcac tggtgaggca ggaccggga ggatgggagg 240
ctgcagcccc aatggtgcct gaaatagttt caggggaaat gcttgggtcc cgaatcggat 300
cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt 360
acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt 420
ttttcttttt tttttttgag acagagtctc actctgtcgg cctgggtgga gtgcagtggc 480
acgatctcgg ctactgcaa cctccggctc cccgggtcaa gcaattctcc tgctcagcc 540

```

tccccgagtag	ctgggattac	aggcatgtgc	caccacgccc	ggctaatttt	tgtattttta	600
gttgagatgg	ggtttcacca	tggtggcgag	gctgggtctt	aactcctgac	ctcaggtaat	660
ccgccagcct	cggcctccca	aagtgtctgg	attacaagcg	tgagccaccg	tgcccggcca	720
acagttttta	aatctgtgga	gacttcattt	cccttgatgc	cttgacagccg	cgccgactac	780
aactcccatc	atgcctggca	gccgctgggg	ccgcgattcc	gcacgtccct	taccgccttc	840
actagtcccc	gcattcttcg	ctgttttctt	aactcgcccc	cttgactagc	gccctggaac	900
agccattttg	gtcgtggagt	gcgagcaagg	ccggccaatc	gccgagtcag	agggccagga	960
ggggcgcggc	cattcgccgc	ccggccccct	ctccgtggct	ggttttctcc	gcgggcgcct	1020
cgggcggaac	ctggagataa	tgggcagcac	ctgggggagc	cctggctggg	tgcggtctgc	1080
tctttgcctg	acgggcttag	tgtctctcgt	ctacgcgctg	cacgtgaagg	cggcgcgcgc	1140
ccgggaccgg	gattaccgcg	cgctctgcga	cgtgggcacc	gccatcagct	gttcgcgcgt	1200
cttctcctcc	aggtgtgcac	gggagtggga	ggcgtggggc	ctcggagcag	ggcggccagg	1260
atgccagatg	attattctgg	agtctgggat	cgggtgtccc	ggggaacgga	cacggggctg	1320
gactgctcgc	ggggtcgttg	cacaggggct	gagctacca	gcgatactgg	tgttcgaaat	1380
aagagtgcga	ggcaagggac	cagacagtgc	tggggactgg	gattattccg	gggactcgca	1440
cgtgaattgg	atgccaagga	ataacggtga	ccaggaaagg	cggggaggca	ggatggcggt	1500
agagattgac	gatgggtctc	aggacggcgc	gcaggtgaag	gggggtgttg	gcgatggctg	1560
cgcccaggaa	caagggtggc	cggctctggc	gtgcgtgatg	gccaggcggt	agcataatga	1620
cggaatacag	aggaggcgag	tgagtggcca	gggagctgga	gattctgggg	tccagggcaa	1680
agataatctg	cccccgactc	ccagtctctg	atgcaaaacc	gagtgaaccg	ttataccagc	1740
cttgccattt	taagaattac	ttaagggccg	ggcgcgggtg	cccactcctg	taatcccagc	1800
actttgggag	gccgaggcgg	atggatcact	tgaagtcagg	agttgaccag	cctggccaac	1860
atggtgaaag	cctgtctcta	ccaaaaatag	aaaaattaat	cgggcgctat	ggcgggtgcc	1920
ttaatcccag	ctactcgggg	gggctaaggc	aggagaatcg	cttgaaccgg	ggaggcggag	1980
gtttcagtga	gccgagatcg	cgccactgca	ctccagcctg	ggccagagtg	agactccgtc	2040
tcaaaaaaaaa	aaaaaaaaaa	aaaaaaaaag	agacttactt	aaggtctaag	atgaaaagca	2100
gggcctacgg	agtagccacg	tccgggcctg	gtctggggag	aggggaggat	agggtcagtg	2160
acatggaatc	ctgacgtggc	caaagggtgc	cggtgccagg	agatcatcga	cccttggaact	2220
aggatgggag	gtcgggggaa	agaggatagc	ccagggtggc	tcttggaagt	cacctttctc	2280
gggcagggtc	caaggcactg	ggttgacagt	cctaacctgg	ttccacccca	ccccaccctt	2340
ctgccaggtg	gggcaggggt	tccgggctgg	tggagcatgt	gctgggacag	gacagcatcc	2400

tcaatcaatc caacagcata ttcggttgca tcttctacac actacagcta ttgttaggtg 2460
agtggctccg cccctccct gcccgccccg ccccgccct catccccctt ggtcagctca 2520
gccccactcc atgcaatctt ggtgatccac acagctgaca gccagctagc tgctcatcac 2580
ggagcgtcct gcgggtgggg atgtggggag gtaactaaca ggagtctttt aattggttta 2640
agtactgtta gaggtgaag ggcccttaa gacatcctag gtccccagggt tttttgtttg 2700
ttgttgtttt gagacagggt ctggctctgt tgcccaaagt gaggtctagg atgcccttag 2760
tgtgcactgg cgtgatctca gttcatggca acctctgcct ccttgcccaa gggatcctcc 2820
caccttagcc tcccaagcag ctggaatcac aggcgtgcac cactatgccc agctaatttt 2880
tgtttttgtt tttttttggt agagatgggt tctcgccatg ttgcccaggc tggctctcaag 2940
caatctgtct gcctcagcct cccaaagtgc tggggggatt acaggcgtga gctaccatgc 3000
cccaccaaca cccagtttt gtggaaaaga tgccgaaatt cttttttaag gagaagctga 3060
gcatgagcta tcttttgtct catttagtgc tcagcaggaa aatttgatc tagtcccata 3120
agaacagaga gaggaaccaa gggagtggaa gacgatggcg cccaggcct tgctgatgcc 3180
atatgccgga gatgagacta tccattacca ccctcccag caggctccca cgctcccttt 3240
gagtcaccct tcccagctcc agagaaggca tcaactgagg aggcccagca ccacggctct 3300
ggctgacaca tgggtcagac ttggccgatt tatttaagaa attttattgc tcagaacttt 3360
ccctccctgg gcaatggcaa gagcttcaga gaccagtccc ttggagggga cctgttgaag 3420
ccttcttttt tttttttttt aagaaataat cttgctctgt tgcccaggct ggagtgcagt 3480
ggcacaatca tagctcactg taacctggct caagcgatcc tcctgagtag ctaggactat 3540
aggcatgtca ctgcaccag ctaatttttt tttttttttt tttttttttt ttgcgacata 3600
gtctcgctct gtcaccaggc tggagtgcag tggcacgac ttggctcact gcaacctctg 3660
cctcccgggt tcaagcaatt ttctgcctc agcctcctga gtagctggga ctacaggcgc 3720
gtgtcaccac gccagctaa tttttgtatt tttagtggag acagggtttc accatgttgg 3780
ctaggatgggt ctcaatctct tgacctgtg atccatccgc cttggcctcc caaagtgcta 3840
ggattacagg cgtgagtcaa cctcacggg catttttttt ttgagacgaa gtcttgcctc 3900
tgctgcccga gctggaatgt ggtggcatga tctcggtca ctgcaacctc cacctcctag 3960
gttcaagcga ttctccacct tagcctcccc agcagctggg attacagggtg cccatcaaca 4020
caccggcta atttttgtat ttttattaga gatggggttt tgccatgttg gccaggctgc 4080
tctcgaactc ctaacctcag gtgatccacc cccattggcc tcccaaaata ctgggattac 4140
aggcatgagc caccgtgccc agctgaattt ctaaattttt gatagagatc gggctcttct 4200

atgttgccca agctggtctt gaactcctag cctaaagcag tcttcccacc tcggcctccc 4260
 agagtgtttg gaatacgtgc gtaagccacc acatctgccc tggagcctct tgttttagag 4320
 acccttccca gcagctcctg gcactctaggt agtgcagtga catcatggag tgttcgggag 4380
 gtggccagtg cctgaagccc acaccggacc ctcttctgce ttgcaggttg cctgcggaca 4440
 cgctgggcct ctgtcctgat gctgctgagc tccctggtgt ctctcgctgg ttctgtctac 4500
 ctggcctgga tctgttctt cgtgctctat gatttctgca ttgtttgtat caccacctat 4560
 gctatcaacg tgagcctgat gtggctcagt ttccggaagg tccaagaacc ccagggcaag 4620
 gctaagaggc actgagccct caaccaagc caggctgacc tcatctgctt tgctttggca 4680
 tgtgagcctt gcctaagggg gcatactctg gtccctagaa ggccctagat gtggggcttc 4740
 tagattaccc cctcctcctg ccatacccg c acatgacaat ggaccaaagtg tgccacacgc 4800
 tcgctctttt ttacaccag tgctctgac tctgtcccca tgggctggtc tccaaagctc 4860
 tttccattgc ccagggaggg aagggtctga gcaataaagt ttcttagatc aatcagccaa 4920
 gtctgaacca tgtgtctgcc atggactgtg gtgctgggcc tccctcggtg ttgccttctc 4980
 tggagctggg aagggtgagt cagagggaga gtggagggcc tgctgggaag ggtggttatg 5040
 ggtagtctca tctccagtgt gtggagtcag caaggcctgg ggcaccattg gccccaccc 5100
 ccaggaaaca ggctggcagc tcgctcctgc tgcccacagg agccaggcct cctctcctgg 5160
 gaaggctgag cacacacctg gaagggcagg ctgcccttct gggtctgtaa atgcttgctg 5220
 ggaagttctt ccttgagttt aactttaacc cctccagttg ccttatcgac cattccaagc 5280
 cagtattggt agccttgagg ggtcagggcc aggttgtgaa ggtttttgtt ttgcctatta 5340
 tgccctgacc acttacctac atgccaagca ctgtttaaga acttggtgtg gcaggggtgca 5400
 gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc 5460
 caggagtcc agaccagcct gggcaaaata gtgagacccc tgtctctaca aaaaaaaaaa 5520
 aaaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcggaag 5580
 ctggcgggaa gactgcttga gccagaagg ttgaggctgc agtgagccat gatcactgca 5640
 ctccagcctg agcaacagag caagaccgtc tccaaaaaaa aacaaaaaac aaaaaaaac 5700
 ttgtgttaac gtgttaaact cgtttaatct ttacagtgat ttatgaggtg ggtactatta 5760
 ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc 5820
 tactgcagga ggctctcagg atttgaatcc acctggctca tctggctcca gcacttatat 5880
 gctttttttt ttgttggttt gtttttgaga cggac 5915

<210> 14

<211> 5915

<212> DNA

<213> Homo sapiens

<400> 14

```

caccatcaga tgggacgtct gtgaaggaga gacctcatct ggcccacagc ttggaaagga      60
gagactgact gttgagttga tgcaagctca ggtggtgccca ggcgggcgcc atgatagtag      120
agaggttagg atactgtcaa ggggtgtgtgt ggccaaagga gtggttctgt gaatgtatgg      180
gagaaagggga gaccgaccac caggaagcac tgggtgaggca ggacccggga ggatgggagg      240
ctgcagccccg aatgggtgcct gaaatagttt caggggaaat gcttggttcc cgaatcggat      300
cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt      360
acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt      420
ttttcttttt tttttttgag acagagtctc actctgtcgg cctggctgga gtgcagtggc      480
acgatctcgg ctcaactgcaa cctccggctc cccggctcaa gcaattctcc tgcctcagcc      540
tcccagtag ctgggattac aggcattgtgc caccacgccc ggctaatttt tgtattttta      600
gttgagatgg ggtttcacca tgttggcgag gctggtcttg aactcctgac ctcaggtaat      660
ccgccagcct cggcctccca aagtgtggg attacaagcg tgagccaccg tgcccggcca      720
acagttttta aatctgtgga gacttcattt cccttgatgc cttgcagccg cgccgactac      780
aactcccatc atgcctggca gccgtgggg cgcgattcc gcacgtccct taccgccttc      840
actagtcccc gcattcttcg ctgttttcct aactcgcccc cttgactagc gccctggaac      900
agccatttgg gtcgtggagt gcgagcacgg ccggccaatc gccgagtcag agggccagga      960
ggggcgcggc cattcgccgc ccggcccctg ctccgtggct ggttttctcc gcgggcgcct     1020
cgggcggaac ctggagataa tgggcagcac ctgggggagc cctggctggg tgcggctcgc     1080
tctttgcctg acgggcttag tgctctcgct ctacgcgctg cacgtgaagg cggcgcgcgc     1140
ccgggaccgg gattaccgcg cgctctgcga cgtgggcacc gccatcagct gttcgcgcgt     1200
cttctcctcc aggtgtgcac gggagtggga ggcgtggggc ctcgagcag ggcggccagg     1260
atgccagatg attattctgg agtctgggat cgggtgtgcc ggggaacgga cacggggctg     1320
gactgctcgc ggggtcgttg cacaggggct gagctaccca gcgatactgg tgttcgaaat     1380
aagagtgcga ggcaaggga cagacagtgc tggggactgg gattattccg gggactcgca     1440
cgtgaattgg atgccaagga ataacggtga ccaggaaagg cggggaggca ggatggcggt     1500
agagattgac gatggtctca aggacggcgc gcagggtgaag gggggtgttg gcgatggctg     1560
cgcccaggaa caaggtggcc cggctctggc gtgcgtgatg gccaggcggt agcataatga     1620
cggaatacag aggaggcgag tgagtggcca gggagctgga gattctgggg tccaggggca     1680
agataatctg ccccgactc ccagtctctg atgcaaaacc gagtgaaccg ttataccagc     1740

```

cttgccattt taagaattac ttaagggccg ggcgcggtgg cccactcctg taatcccagc	1800
actttgggag gccgaggcgg atggatcact tgaagtcagg agttgaccag cctggccaac	1860
atggtgaaag cctgtctcta ccaaaaatag aaaaattaat cgggcgctat ggcggtgccc	1920
ttaatcccag ctactcgggg gggctaaggc aggagaatcg cttgaacccg ggaggcggag	1980
gtttcagtga gccgagatcg cgccactgca ctccagcctg ggccagagtg agactccgtc	2040
tcaaaaaaaaa aaaaaaaaaa aaaaaaaaaa agacttactt aaggtctaag atgaaaagca	2100
gggcctacgg agtagccacg tccgggcctg gtctggggag aggggaggat agggtcagt	2160
acatggaatc ctgacgtggc caaaggtgcc cgggtgccagg agatcatcga cccttggtact	2220
aggatgggag gtcgggggaa agaggatagc ccagggtggct tcttggaat cacctttctc	2280
gggcagggtc caaggcactg ggttgacagt cctaacctgg ttccaccca cccacccct	2340
ctgccagggtg gggcaggggt ttcgggctgg tggagcatgt gctgggacag gacagcatcc	2400
tcaatcaatc caacagcata ttcgggtgca tcttctacac actacagcta ttgttaggtg	2460
agtggctccg cccctccct gcccgccccg ccccgccct catccccctt ggtcagctca	2520
gccccactcc atgcaatctt ggtgatccac acagctgaca gccagctagc tgctcatcac	2580
ggagcgtcct gcgggtgggg atgtggggag gtaactaaca ggagtctttt aattggttta	2640
agtactgtta gaggtgaag ggccttaaa gacatcctag gtccccagggt tttttgtttg	2700
ttgttgtttt gagacagggt ctggctctgt tgcccaaagt gaggtctagg atgcccttag	2760
tgtgcactgg cgtgatctca gttcatggca acctctgcct ccctgcccga gggatccctc	2820
caccttagcc tcccagcag ctggaatcac aggcgtgcac cactatgcc agctaatttt	2880
tgtttttgtt tttttttggt agagatggtg tctcgccatg ttgccaggc tgggtctcaag	2940
caatctgtct gcctcagcct cccaaagtgc tggggggatt acaggcgtga gctaccatgc	3000
cccaccaaca cccagtttt gtggaaaaga tgccgaaatt cttttttaag gagaagctga	3060
gcatgagcta tcttttgtct catttagtgc tcagcaggaa aatttgtatc tagtcccata	3120
agaacagaga gaggaaccaa gggagtggaa gacgatggcg cccaggcct tgctgatgcc	3180
atatgccgga gatgagacta tccattacca ccctcccag caggctccca cgctcccttt	3240
gagtcaccct tcccagctcc agagaaggca tctactgagg aggccagca ccatggctcct	3300
ggctgacaca tggttcagac ttggccgatt tatttaagaa attttattgc tcagaacttt	3360
ccctccctgg gcaatggcaa gagcttcaga gaccagtccc ttggagggga cctgttgaag	3420
ccttcttttt tttttttttt aagaaataat cttgctctgt tgcccaggct ggagtgcagt	3480
ggcacaatca tagctcactg taacctggct caagcgatcc tctgagtag ctaggactat	3540

aggcatgtca	ctgcacccag	ctaatttttt	tttttttttt	tttttttttt	ttgcgacata	3600
gtctcgctct	gtcaccaggc	tggagtgcag	tggcacgata	ttggctcact	gcaacctctg	3660
cctccccggg	tcaagcaatt	ttcctgcctc	agcctcctga	gtagctggga	ctacaggcgc	3720
gtgtcaccac	gcccagctaa	tttttgtatt	tttagtggag	acagggtttc	accatgttgg	3780
ctaggatggg	ctcaatctct	tgacctgggt	atccatccgc	cttggcctcc	caaagtgcta	3840
ggattacagg	cgtgagtcaa	cctcacccgg	catttttttt	ttgagacgaa	gtcttgctct	3900
tgctgcccaa	gctggaatgt	ggtagcatga	tctcggtcca	ctgcaacctc	cacctcctag	3960
gttcaagcga	ttctccacct	tagcctcccc	agcagctggg	attacaggtg	cccatcaaca	4020
cacccggcta	atttttgtat	ttttattaga	gatgggggtt	tgccatgttg	gccaggctgc	4080
tctcgaactc	ctaacctcag	gtgateccac	cccattggcc	tcccaaaata	ctgggattac	4140
aggcatgagc	caccgtgccc	agctgaattt	ctaaattttt	gatagagata	gggtctttct	4200
atgttgccca	agctggtctt	gaactcctag	cctaaagcag	tcttcccacc	tcggcctccc	4260
agagtgtttg	gaatacgtgc	gtaagccacc	acatctgccc	tggagcctct	tgtttttagag	4320
acccttccca	gcagctcctg	gcacttaggt	agtgcagtga	catcatggag	tgctcgggag	4380
gtggccagtg	cctgaagccc	acaccggacc	ctcttctgcc	ttgcagggtg	cctgcccaca	4440
cgctgggcct	ctgtcctgat	gctgctgagc	tccctgggtg	ctctcgctgg	ttctgtctac	4500
ctggcctgga	tcctgttctt	cgtgctctat	gatttctgca	ttgtttgtat	caccacctat	4560
gctatcaacg	tgagcctgat	gtggctcagt	ttccggaagg	tccaagaacc	ccagggaag	4620
gctaagaggc	actgagccct	caacccaagc	caggctgacc	tcatctgctt	tgctttggca	4680
tgtgagcctt	gcctaagggg	gcatactctg	gtccctagaa	ggccctagat	gtggggcttc	4740
tagattaccc	cctcctcctg	ccatacccac	acatgacaat	ggaccaaata	tgccacacgc	4800
tcgctctttt	ttacacccag	tgctctgac	tctgtcccca	tgggctgggc	tccaaagctc	4860
tttccattgc	ccagggaagg	aaggttctga	gcaataaagt	ttcttagata	aatcagccaa	4920
gtctgaacca	tgtgtctgcc	atggactgtg	gtgctgggcc	tccctcggtg	ttgccttctc	4980
tggagctggg	aagggtgagt	cagagggaga	gtggagggcc	tgctgggaag	ggtaggttatg	5040
ggtagtctca	tctccagtgt	gtggagtcat	caaggcctgg	ggcaccattg	gccccacccc	5100
ccaggaaaca	ggctggcagc	tcgctcctgc	tgccacaggg	agccaggcct	cctctcctgg	5160
gaaggctgag	cacacacctg	gaagggcagg	ctgcccttct	ggttctgtaa	atgcttgctg	5220
ggaagtctct	ccttgagttt	aactttaacc	cctccagttg	ccttatcgac	cattccaagc	5280
cagtattggg	agccttggag	ggtaggggcc	aggttgtgaa	ggtttttggt	ttgcctatta	5340
tgccctgacc	acttacctac	atgccaagca	ctgtttaaga	acttgtgttg	gcagggtgca	5400

gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc 5460
caggagttcc agaccagcct gggcaaaata gtgagacccc tgtctctaca aaaaaaaaaa 5520
aaaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcggaag 5580
ctggcgggaa gactgcttga gcccagaagg ttgaggctgc agtgagccat gatcactgca 5640
ctccagcctg agcaacagag caagaccgtc tccaaaaaaa aacaaaaaac aaaaaaaac 5700
ttgtgttaac gtgttaaact cgtttaatat ttacagtgat ttatgaggtg ggtactatta 5760
ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc 5820
tactgcagga ggctctcagg atttgaatcc acctgggtcca tctgggtcca gcatctatat 5880
gctttttttt ttgttggttt gtttttgaga cggac 5915

<210> 15
<211> 5915
<212> DNA
<213> Homo sapiens

<400> 15
caccatcaga tgggacgtct gtgaaggaga gacctcatct ggcccacagc ttggaaagga 60
gagactgact gttgagttga tgcaagctca ggtgttgcca ggcgggcgcc atgatagtag 120
agaggttagg atactgtcaa ggggtgtgtgt ggccaaagga gtggttctgt gaatgtatgg 180
gagaaagggg gaccgaccac caggaagcac tggtagaggc ggaccggga ggatgggagg 240
ctgcagcccc aatggtgcct gaaatagttt caggggaaat gcttggttcc cgaatcggat 300
cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt 360
acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt 420
ttttcttttt tttttttgag acagagtctc actctgtcgg cctggctgga gtgcagtggc 480
acgatctcgg ctcaactgcaa cctccggctc cccggctcaa gcaattctcc tgcctcagcc 540
tcccgagtag ctgggattac agacatgtgc caccacgccc ggctaatttt tgtattttta 600
gttgagatgg ggtttcacca tgttggcgag gctggtcttg aactcctgac ctgaggaat 660
ccgccagcct cggcctccca aagtgtcggg attacaagcg tgagccaccg tgcccggcca 720
acagttttta aatctgtgga gacttcattt cccttgatgc cttgcagccg cgccgactac 780
aactcccatc atgcctggca gccgctgggg ccgcgattcc gcacgtccct taccgcttc 840
actagtcccc gcattcttcg ctgttttcct aactcgcccc cttgactagc gccctggaac 900
agccatttgg gtcgtggagt gcgagcacgg ccggccaatc gccgagtcag agggccagga 960
ggggcgcggc cattcgccgc ccggcccctg ctccgtggct gggtttctcc gcgggcgcct 1020
cgggcggaac ctggagataa tgggcagcac ctgggggagc cctggctggg tgcggctcgc 1080

tctttgctg acgggcttag tgctctcgct ctacgcgctg cacgtgaagg cggcgcgcg	1140
ccgggaccgg gattaccgcg cgctctgcga cgtgggcacc gccatcagct gttcgcgct	1200
cttctctcc aggtgtgcac gggagtggga ggcgtggggc ctcggagcag ggcggccagg	1260
atgccagatg attattctgg agtctgggat cgggtgtgcc ggggaacgga cacggggctg	1320
gactgctcgc ggggtcggtg cacaggggct gagctacca gcgatactgg tgttcgaaat	1380
aagagtgcga ggcaaggac cagacagtgc tggggactgg gattattccg gggactcgca	1440
cgtgaattgg atgccaagga ataacggtga ccaggaaagg cggggaggca ggatggcgt	1500
agagattgac gatggctctca aggacggcg gcaggtgaag ggggggtgtg gcgatggctg	1560
cgcccaggaa caaggtggcc cggctctggct gtgcgtgatg gccaggcgtt agcataatga	1620
cggaatacag aggaggcgag tgagtggcca gggagctgga gattctgggg tccagggcaa	1680
agataatctg ccccgactc ccagtctctg atgcaaaacc gagtgaaccg ttataccagc	1740
cttgccattt taagaattac ttaagggccg ggcgcggtgg cccactcctg taatcccagc	1800
actttgggag gccgaggcgg atggatcact tgaagtcagg agttgaccag cctggccaac	1860
atggtgaaag cctgtctcta ccaaaaatag aaaaattaat cgggcgctat ggcgggtgcc	1920
ttaatcccag ctactcgggg gggctaaggc aggagaatcg cttgaaccgc ggaggcggag	1980
gtttcagtga gccgagatcg cgccactgca ctccagcctg ggccagagtg agactccgtc	2040
tcaaaaaaaaa aaaaaaaaaa aaaaaaaaaa agacttactt aaggtctaag atgaaaagca	2100
gggcctacgg agtagccacg tccgggcctg gtctggggag aggggaggat agggtcagt	2160
acatggaatc ctgacgtggc caaagggtgcc cggtgccagg agatcatcga cccttggtgact	2220
aggatgggag gtcgggggac agaggatagc ccagggtggct tcttggaat cacctttctc	2280
gggcagggtc caaggcactg ggttgacagt cctaacctgg ttccacccca cccacccct	2340
ctgccaggtg gggcaggggt ttcgggctgg tggagcatgt gctgggacag gacagcatcc	2400
tcaatcaatc caacagcata ttcggttgca tcttctacac actacagcta ttgttaggtg	2460
agtggctccg cccctccct gcccgccccg ccccgccct catccccctt ggtcagctca	2520
gccccactcc atgcaatctt ggtgatccac acagctgaca gccagctagc tgctcatcac	2580
ggagcgtcct gcgggtgggg atgtggggag gtaactaaca ggagtctttt aattggttta	2640
agtactgtta gaggtgaag ggccttaaa gacatcctag gtccccagg tttttgtttg	2700
ttgttgtttt gagacagggt ctggctctgt tgcccaaagt gaggtctagg atgcccttag	2760
tgtgactgg cgtgatctca gttcatggca acctctgect cctgccccaa gggatcctcc	2820
caccttagcc tccaagcag ctggaatcac aggcgtgcac cactatgccc agctaatttt	2880

tgtttttgtt	tttttttggg	agagatgggtg	tctcgccatg	ttgcccaggc	tggtctcaag	2940
caatctgtct	gcctcagcct	cccaaagtgc	tggggggatt	acaggcgtga	gctaccatgc	3000
cccaccaaca	ccccagtttt	gtggaaaaga	tgccgaaatt	cctttttaag	gagaagctga	3060
gcatgagcta	tcttttgtct	catttagtgc	tcagcaggaa	aatttgtatc	tagtcccata	3120
agaacagaga	gaggaaccaa	gggagtggaa	gacgatggcg	ccccaggcct	tgctgatgcc	3180
atatgccgga	gatgagacta	tccattacca	cccttcccag	caggctccca	cgctcccttt	3240
gagtcaccct	tcccagctcc	agagaaggca	tactgagggg	aggcccagca	ccatggctct	3300
ggctgacaca	tggttcagac	ttggccgatt	tatttaagaa	attttattgc	tcagaacttt	3360
ccctccctgg	gcaatggcaa	gagcttcaga	gaccagtccc	ttggagggga	cctgttgaag	3420
ccttcttttt	tttttttttt	aagaaataat	cttgctctgt	tgcccaggct	ggagtgcagt	3480
ggcacaatca	tagctcactg	taacctgggt	caagcgatcc	tctgagtag	ctaggactat	3540
aggcatgtca	ctgcacccag	ctaatttttt	tttttttttt	tttttttttt	ttgcgacata	3600
gtctcgctct	gtcaccaggc	tggagtgcag	tggcacgatc	ttggctcact	gcaacctctg	3660
cctcccgggt	tcaagcaatt	ttcctgcctc	agcctcctga	gtagctggga	ctacaggcgc	3720
gtgtcaccac	gcccagctaa	tttttgtatt	tttagtggag	acagggtttc	accatgttgg	3780
ctaggatggg	ctcaatctct	tgacctgggtg	atccatccgc	cttggcctcc	caaagtgcta	3840
ggattacagg	cgtgagtcaa	cctcaccggg	catttttttt	ttgagacgaa	gtcttgcctc	3900
tgctgcccc	gctggaatgt	ggtggcatga	tctcggtcca	ctgcaacctc	cacctcctag	3960
gttcaagcga	ttctccacct	tagcctcccc	agcagctggg	attacagggtg	cccatcaaca	4020
caccoggcta	atttttgtat	ttttattaga	gatgggggtt	tgccatgttg	gccaggctgc	4080
tctcgaactc	ctaacctcag	gtgatccacc	ccatttggcc	tcccaaaata	ctgggattac	4140
aggcatgagc	caccgtgccc	agctgaattt	ctaaattttt	gatagagatc	gggtctttct	4200
atgttgcccc	agctgggtct	gaactcctag	cctaaagcag	tcttcccacc	tcggcctccc	4260
agagtgtttg	gaatacgtgc	gtaagccacc	acatctgccc	tggagcctct	tgtttttagag	4320
acccttcccc	gcagctcctg	gcacttaggt	agtgcagtga	catcatggag	tgttcgggag	4380
gtggccagtg	cctgaagccc	acaccggacc	ctcttctgcc	ttgcagggtg	cctgcggaca	4440
cgctgggcct	ctgtcctgat	gctgctgagc	tccctgggtg	ctctcgctgg	ttctgtctac	4500
ctggcctgga	tctgtttctt	cgtgctctat	gatttctgca	ttgtttgtat	caccacctat	4560
gctatcaacg	tgagcctgat	gtggctcagt	ttccggaagg	tccaagaacc	ccagggcaag	4620
gctaagaggc	actgagccct	caacccaagc	caggctgacc	tcatctgctt	tgctttggca	4680
tgtgagcctt	gcctaagggg	gcatatctgg	gtccctagaa	ggccctagat	gtggggcttc	4740

```

tagattaccc cctcctcctg ccatacccg c acatgacaat ggaccaa atg tgccacacgc 4800
tcgctctttt ttacaccag tgctctgac tctgtcccca tgggctgggc tccaaagctc 4860
tttccattgc ccagggaggg aagggtctga gcaataaagt ttcttagatc aatcagccaa 4920
gtctgaacca tgtgtctgcc atggactgtg gtgctgggcc tccctcggtg ttgccttctc 4980
tggagctggg aaggggtgagt cagagggaga gtggagggcc tgctgggaag ggtggttatg 5040
ggtagtctca tctccagtgt gtggagtcag caaggcctgg ggcaccattg gccccaccc 5100
ccaggaaaca ggctggcagc tcgctcctgc tgccacaggg agccaggcct cctctcctgg 5160
gaaggctgag cacacacctg gaagggcagg ctgcccttct ggttctgtaa atgcttgctg 5220
ggaagttctt ccttgagttt aactttaacc cctccagttg ccttatcgac cattccaagc 5280
cagtattggt agccttgagg ggtcagggcc aggttgtgaa ggtttttgtt ttgcctatta 5340
tgccctgacc acttacctac atgccaagca ctgtttaaga acttgtgttg gcaggggtgca 5400
gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc 5460
caggagttcc agaccagcct gggcaaaaata gtgagacccc tgtctctaca aaaaaaaaaa 5520
aaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcggaag 5580
ctggcgggaa gactgcttga gcccagaagg ttgaggctgc agtgagccat gatcactgca 5640
ctccagcctg agcaacagag caagaccgtc tccaaaaaaa aacaaaaaac aaaaaaaac 5700
ttgtgttaac gtgttaaact cgtttaatct ttacagtgat ttatgaggtg ggtactatta 5760
ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc 5820
tactgcagga ggctctcagg atttgaatcc acctgggtcca tctgggtcca gcatctatat 5880
gctttttttt ttgttggttt gtttttgaga cggac 5915

```

<210> 16

<211> 5915

<212> DNA

<213> Homo sapiens

<400> 16

```

caccatcaga tgggacgtct gtgaaggaga gacctcatct ggcccacagc ttggaaagga 60
gagactgact gttgagttga tgcaagctca ggtgttgcca ggcgggcgcc atgatagtag 120
agaggttagg atactgtcaa ggggtgtgtg ggccaaagga gtggttctgt gaatgtatgg 180
gagaaaggga gaccgaccac caggaagcac tggtagggca ggaccgggga ggatgggagg 240
ctgcagcccc aatgggtgcct gaaatagttt caggggaaat gcttgggtcc cgaatcggat 300
cgccgtattc gctggatccc ctgatccgct ggtctctagg tcccggatgc tgcaattctt 360
acaacaggac ttggcatagg gtaagcgcaa atgctgttaa ccacactaac acactttttt 420

```

ttttcttttt	tttttttgag	acagagtctc	actctgtcgg	cctggctgga	gtgcagtggc	480
acgatctcgg	ctcactgcaa	cctccggctc	cccggctcaa	gcaattctcc	tgccctcagcc	540
tcccgagtag	ctgggattac	aggcatgtgc	caccacgccc	ggctaatttt	tgtattttta	600
gttgagatgg	ggtttcacca	tgttggcgag	gctggctctt	aactcctgac	ctcaggtaat	660
ccgccagcct	cggcctccca	aagtgtctgg	attacaagcg	tgagccaccg	tgcccggcca	720
acagttttta	aatctgtgga	gacttcattt	cccttgatgc	cttgccagccg	cgccgactac	780
aactcccatc	atgcctggca	gccgtctggg	ccgcgattcc	gcacgtccct	tacccgcttc	840
actagtcccg	gcattcttcg	ctgttttcct	aactcgcccc	cttgactagc	gccctggaac	900
agccatttgg	gtcgtggagt	gcgagcacgg	ccggccaatc	gccgagtcag	agggccagga	960
ggggcgcggc	cattcgccgc	ccggccccct	ctccgtggct	ggttttctcc	gcgggcgcct	1020
cgggcggaac	ctggagataa	tgggcagcac	ctgggggagc	cctggctggg	tgccgctcgc	1080
tctttgcctg	acgggcttag	tgtctctcgt	ctacgcgctg	cacgtgaagg	cggcgcgcgc	1140
ccgggaccgg	gattaccgcg	cgctctgcga	cgtgggcacc	gccatcagct	gttcgcgcgt	1200
cttctcctcc	aggtgtgcac	gggagtggga	ggcgtggggc	ctcggagcag	ggcggccagg	1260
atgccagatg	attattctgg	agtctgggat	cgggtgtgcc	ggggaacgga	cacggggctg	1320
gactgctcgc	ggggctcgtt	cacaggggct	gagctacca	gcgatactgg	tgttcgaaat	1380
aagagtgcga	ggcaagggac	cagacagtgc	tggggactgg	gattattccg	gggactcgca	1440
cgtgaattgg	atgccaagga	ataacggtga	ccaggaaagg	cggggaggca	ggatggcggt	1500
agagattgac	gatggctctc	aggacggcgc	gcaggtgaag	gggggtgttg	gcgatggctg	1560
cgcccaggaa	caagggtggc	cggtctggct	gtgcgtgatg	gccaggcggt	agcataatga	1620
cgggaatacag	aggaggcgag	tgagtggcca	gggagctgga	gattctgggg	tccaggggca	1680
agataatctg	cccccgactc	ccagtctctg	atgcaaaacc	gagtgaaccg	ttataccagc	1740
cttgccattt	taagaattac	ttaagggccg	ggcgcggtgg	cccactcctg	taatcccagc	1800
actttgggag	gccgaggcgg	atggatcact	tgaagtcagg	agttgaccag	cctggccaac	1860
atgggtgaaag	cctgtctcta	ccaaaaatag	aaaaattaat	cgggcgctat	ggcgggtgcc	1920
ttaatcccag	ctactcgggg	gggctaaggc	aggagaatcg	cttgaaccgg	ggaggcgagg	1980
gtttcagtga	gccgagatcg	cgccactgca	ctccagcctg	ggccagagtg	agactccgtc	2040
tcaaaaaaaaa	aaaaaaaaaa	aaaaaaaaaag	agacttactt	aaggctaaag	atgaaaagca	2100
gggcctacgg	agtagccacg	tccgggcctg	gtctggggag	aggggaggat	agggtcagtg	2160
acatggaatc	ctgacgtggc	caaaggtgcc	cggtgccagg	agatcatcga	cccttggaact	2220

aggatgggag gtcggggaac agaggatagc ccaggtggct tcttggaat cacctttctc 2280
 gggcagggtc caaggcactg gggtgacagt cctaacctgg ttccaccca cccacccct 2340
 ctgccagggtg gggcaggggt ttccggctgg tggagcatgt gctgggacag gacagcatcc 2400
 tcaatcaatc caacagcata ttccggttgca tcttctacac actacagcta ttgttaggtg 2460
 agtggctccg cccctccct gcccgccccg ccccgccccct catccccctt ggtcagctca 2520
 gcccactcc atgcaatctt ggtgatccac acagctgaca gccagctagc tgctcatcac 2580
 ggagcgtcct gcgggtgggg atgtggggag gtaactaaca ggagtctttt aattggttta 2640
 agtactgtta gaggtgaag ggcccttaa gacatcctag gtccccaggt tttttgtttg 2700
 ttgttgtttt gagacagggt ctggctctgt tgcccaaagt gaggtctagg atgcccttag 2760
 tgtgcactgg cgtgatctca gttcatggca acctctgcct ccctgcccaa gggatccctc 2820
 caccttagcc tcccaagcag ctggaatcac aggcgtgcac cactatgccc agctaatttt 2880
 tgtttttgtt ttttttttgt agagatggtg tctcgccatg ttgccaggc tggctcaag 2940
 caatctgtct gcctcagcct cccaaagtgc tggggggatt acaggcgtga gctaccatgc 3000
 cccaccaaca cccagtttt gtggaaaaga tgccgaaatt cttttttaag gagaagctga 3060
 gcatgagcta tcttttgtct catttagtgc tcagcaggaa aatttgtatc tagtccata 3120
 agaacagaga gaggaaccaa gggagtggaa gacgatggcg cccaggcct tgctgatgcc 3180
 atatgccga gatgagacta tccattacca ccctccag caggctccca cgtcccttt 3240
 gagtcaccct tcccagctcc agagaaggca tctactgagg aggccagca ccatggctct 3300
 ggctgacaca tggttcagac ttggccgatt tatttaagaa attttattgc tcagaacttt 3360
 ccctccctgg gcaatggcaa gagcttcaga gaccagtccc ttggagggga cctgttgaag 3420
 ccttcttttt tttttttttt aagaaataat cttgctctgt tgcccaggct ggagtgcagt 3480
 ggcacaatca tagctcactg taacctggct caagcgatcc tctgagtag ctaggactat 3540
 aggcattgca ctgcaccag ctaatttttt tttttttttt tttttttttt ttgcgacata 3600
 gtctcgtct gtcaccaggc tggagtgcag tggcacgac ttggctcact gcaacctctg 3660
 cctcccggt tcaagcaatt ttctgcctc agcctcctga gtagctggga ctacaggcgc 3720
 gtgtcaccac gccagctaa tttttgtatt tttagtggag acagggtttc accatgttgg 3780
 ctaggatggt ctcaatctct tgacctggtg atccatccgc cttggcctcc caaagtgcata 3840
 ggattacagg cgtgagtcaa cctcaccggg catttttttt ttgagacgaa gtcttgcctc 3900
 tgctgcccga gctggaatgt ggtggcatga tctcggtca ctgcaacctc cacctcctag 3960
 gttcaagcga ttctccacct tagcctcccc agcagctggg attacagggtg cccatcaaca 4020
 caccggcta atttttgtat ttttattaga gatgggggtt tgccatgttg gccaggctgc 4080

tctcgaactc ctaacctcag gtgatccacc cccattggcc tcccaaaata ctgggattac	4140
aggcatgagc caccgtgccc agctgaattt cttaaatttt gatagagatc gggctcttct	4200
atgttgccca agctggctct gaactcctag cctaaagcag tcttcccacc tcggcctccc	4260
agagtgtttg gaatacgtgc gtaagccacc acatctgccc tggagcctct tgttttagag	4320
acccttccca gcagctcctg gcctctaggt agtgcagtga catcatggag tgttcgggag	4380
gtggccagtg cctgaagccc acaccggacc ctcttctgcc ttgcaggttg cctgcggaca	4440
cgctgggcct ctgtcctgat gctgctgagc tccctgggtg ctctcgctgg ttctgtctac	4500
ttggcctgga tctgttctt cgtgctctat gatttctgca ttgtttgtat caccacctat	4560
gctatcaacg tgagcctgat gtggctcagt ttccggaagg tccaagaacc ccagggaag	4620
gctaagaggc actgagccct caaccaagc caggctgacc tcatctgctt tgctttggca	4680
tgtgagcctt gcctaagggg gcatactggt gtccctagaa ggccctagat gtggggcttc	4740
tagattaccc cctcctcctg ccataccgc acatgacaat ggaccaaagtg tgccacacgc	4800
tcgctctttt ttacaccagc tgcctctgac tctgtcccca tgggctggtc tccaaagctc	4860
tttccattgc ccaggaggag aaggttctga gcaataaagt ttcttagatc aatcagccaa	4920
gtctgaacca tgtgtctgcc atggactgtg gtgctgggcc tccctcggtg ttgccttctc	4980
tggagctggg aagggtgagt cagagggaga gtggagggcc tgctgggaag ggtgggtatg	5040
ggtagtctca tctccagtgt gtggagtcag caaggcctgg ggcaccattg gccccaccc	5100
ccaggaaaca ggctggcagc tcgctcctgc tgccacagg agccaggcct cctctcctgg	5160
gaaggctgag cacacacctg gaagggcagg ctgcccttct ggttctgtaa atgcttgctg	5220
ggaagtctct ccttgagttt aactttaacc cctccagttg ccttatcgac cattccaagc	5280
cagtattggt agccttgag gtgcagggcc aggttggtgaa ggtttttgtt ttgcctatta	5340
tgccctgacc acttacctac atgccaagca ctgtttaaga acttggtgtg gcagggtgca	5400
gtggctcaca cctgtaatcc ctgtactttg ggaggccaag gcaggaggat cacttgaggc	5460
caggagtcc agaccagcct gggcaaaata gtgagacccc tgtctctaca aaaaaaaaaa	5520
aaaaaaaaaa ttagccaggc atggtggtgt atgtacctat agtcccaact aatcggggaag	5580
ctggcgggaa gactgcttga gcccagaagg ttgaggctgc agtgagccat gatcactgca	5640
ctccagcctg agcaacagag caagaccgtc tccaaaaaaa aacaaaaaac aaaaaaaac	5700
ttgtgttaac gtgttaaact cgtttaatct ttacagtgat ttatgagggtg ggtactatta	5760
ttatccctat cttgatgata gggacagagt ggctaattag tatgcctgag atcacacagc	5820
tactgcagga ggctctcagg atttgaatcc acctgggtcca tctgggtcca gcctctatat	5880

gcttttttttt ttgttggttt gtttttgaga cggac

5915

<210> 17
<211> 15
<212> DNA
<213> Artificial

<220>
<223> vk2581 G>C VIC probe sequence

<400> 17
tcatcacgga gcgtc

15

<210> 18
<211> 15
<212> DNA
<213> Artificial

<220>
<223> vk2581 G>C FAM probe sequence

<400> 18
tcatcaccga gcgtc

15

<210> 19
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 19
ggtgatccac acagctgaca

20

<210> 20
<211> 23
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 20
cctgttagtt acctccccac atc

23

<210> 21
<211> 15
<212> DNA
<213> Artificial

<220>
<223> vk3294 T>C VIC probe sequence

<400> 21
ccaggaccat ggtgc

15

<210> 22
<211> 15
<212> DNA
<213> Artificial

<220>
<223> vk3294 T>C FAM probe sequence

<400> 22
ccaggaccgt ggtgc 15

<210> 23
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 23
gctccagaga aggcatact 20

<210> 24
<211> 22
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 24
gccaaagtctg aaccatgtgt ca 22

<210> 25
<211> 15
<212> DNA
<213> Artificial

<220>
<223> vk4769 G>A VIC probe sequence

<400> 25
ataccgcac atgac 15

<210> 26
<211> 16
<212> DNA
<213> Artificial

<220>
<223> vk4769 G>A FAM probe sequence

<400> 26
cataccaca catgac 16

<210> 27
<211> 22
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 27
gtccctagaa ggccctagat gt

22

<210> 28
<211> 21
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 28
gtgtggcaca tttggtccat t

21

<210> 29
<211> 19
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 29
ccaatcgccg agtcagagg

19

<210> 30
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 30
cccagtcccc agcactgtct

20

<210> 31
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 31
aggggaggat agggtcagtg

20

<210> 32
<211> 21
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 32
cctgttagtt acctccccac a 21

<210> 33
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 33
atacgtgcgt aagccaccac 20

<210> 34
<211> 20
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 34
accagatat gcccccttag 20